

CLAIMS

1 1. A photoinduced polymerizable cyanate ester composition for use in reinforcing
2 a bond, comprising:
3 a cyanate ester substance comprised of a cationically polymerizable cyanate
4 ester monomer, a cyanate ester prepolymer, or a mixture of the
5 monomer and prepolymer;
6 an effective amount of modifier for enhancing fracture properties of said bond
7 and for assisting in reinforcing said bond;
8 a filler for controlling thermal expansion of said composition and for assisting
9 in reinforcing said bond; and
10 a polymerization photoinitiator comprised of a catalytically effective amount of
11 an organometallic complex salt having a metal cation, upon
12 photolysis, said polymerization photoinitiator liberating at least one
13 coordination site and polymerizing the cyanate ester substance,
14 wherein said metal cation in the organometallic complex is selected
15 from the group consisting of elements of Periodic Groups IVB, VB,
16 VIB, VIIB, and VIIIB.

1 2. The photoinduced polymerizable cyanate ester composition of claim 1, wherein
2 said effective amount of modifier includes a toughening agent comprised of
3 elastomeric units.

1 3. The photoinduced polymerizable cyanate ester composition of claim 2, wherein
2 said elastomeric units are endcapped with reactive functional groups.

1 4. The photoinduced polymerizable cyanate ester composition of claim 2, wherein
2 said elastomeric units have molecular weights ranging between approximately
3 500 and approximately 5000.

1 5. The photoinduced polymerizable cyanate ester composition of claim 1, wherein
2 said effective amount of modifier includes elastomers, said elastomers reacting
3 with said cyanate ester substance upon curing to form an epoxy terminated
4 elastomer.

1 6. The photoinduced polymerizable cyanate ester composition of claim 1, wherein
2 said cyanate ester substance is solvent free.

1 1. A process for providing a photoinduced polymerizable cyanate ester
2 composition for use in reinforcing a bond, said process comprising the steps of:
3 providing cyanate ester substance comprised of a cationically polymerizable
4 cyanate ester monomer, a cyanate ester prepolymer, or a mixture of
5 the monomer and prepolymer;
6 adding to the cyanate ester substance an effective amount of modifier for
7 enhancing fracture properties of said bond and for assisting in
8 reinforcing said bond;
9 adding to the cyanate ester substance a filler for controlling thermal expansion
10 of said composition and for assisting in reinforcing said bond; and
11 adding to the cyanate ester substance a polymerization photoinitiator
12 comprised of a catalytically effective amount of an organometallic
13 complex salt having a metal cation, upon photolysis, the
14 polymerization photoinitiator liberating at least one coordination site
15 and curing the cyanate ester substance, wherein said metal cation in
16 the organometallic complex is selected from the group consisting of
17 elements of Periodic Groups IVB, VB, VIB, VIIB, and VIIIB.

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- 1 8. A lead protective composition comprising the polymerization product of:
2 (a) at least one cyanate monomer;
3 (b) a polymerization photoinitiator comprised of a catalytically effective
4 amount of an organometallic complex salt having a metal cation, the
5 polymerization photoinitiator liberating at least one coordinative site
6 and polymerizing the at least one cyanate monomer, wherein said
7 metal cation in the organometallic complex is selected from the group
8 consisting of elements of Periodic Group IVB, VB, VIB, VIIB and
9 VIIIIB;
10 (c) a filler for controlling thermal-expansion of said composition and for
11 assisting in reinforcing said bond; and
12 (d) an effective amount of a modifier for enhancing fracture properties of
13 the protective composition as compared to a lead bond formed without
14 a lead protective composition and for assisting in reinforcing said
15 bond.

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- 1 9. The lead protective composition of claim 8, wherein said effective amount of
2 modifier includes elastomeric units.

- 1 10. The lead protective composition of claim 9, wherein said elastomeric units are
2 endcapped with reactive functional groups.

1 11. The lead protective composition of claim 9, wherein said elastomeric units
2 have molecular weights ranging between approximately 500 and approximately
3 5000.

12. The lead protective composition of claim 8, wherein said effective amount of modifier includes elastomers, said elastomers reacting with said cyanate ester substance upon curing to form an epoxy terminated elastomer.

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